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Case report

Mediastinal abscess compressing the left atrium: A case report and literature review

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ARTICLE INFO

Article history:
Received 15 May 2013
Accepted 25 June 2013
Available online 29 June 2013

Keywords:
Left atrial compression
Abscess
Mediastinum
Esophagus
Heart failure
Metastases to the heart

ABSTRACT

The left atrium is a thin-walled cardiac chamber with a low intraluminal pressure. It is located in the inferoposterior part of mediastinum, near to structures such as the esophagus and descending aorta. This makes it vulnerable to compression by pathologic changes associated with the gastrointestinal tract, mediastinum, lungs, pericardium and aorta. Depending on the level of the compression the patient may be asymptomatic or develops signs of cardiac insufficiency. We describe a lethal course of left atrial compression due to a chronic mediastinal abscess secondary to a ruptured esophageal ulcer. To our knowledge this is the first such case described, in part because bordered mediastinitis with abscess development is very rare.

Case report

An 87 year-old woman was admitted to hospital for chest pain propagating to her back and aggravated by inspiration. The patient did not suffer from shortness of breath, but had been generally immobile for an extended period of time. She also complained of anorexia and weight loss during the previous year. In response to these complaints she had undergone gastroscopy about 6 months prior. Gastroscopy revealed multiple ulcers of the distal esophagus including one deep ulcer with swollen borders. No tumoral cells were found in the biopsy samples. As a result the patient was put on long-term therapy with omeprazole.

She had no fever on admission and had normal blood pressure (110/70 mmHg). She was in sinus tachycardia (105 bpm); however, there were no signs of ischemia on the electrocardiogram (ECG). Bilaterally weaken breath sounds in the lower lobes of the lungs were found and crackles were noted during the physical examination. Laboratory tests showed only a slight elevation of C-reactive protein (16.1 mg/L; normal level 0.0–12.0 mg/L), leukocytosis ($12.6 \times 10^9\ l^{-1}$; ref. $4.0–10.0 \times 10^9\ l^{-1}$) and thrombocytosis ($495 \times 10^9\ l^{-1}$; ref. $135–400 \times 10^9\ l^{-1}$). Other laboratory results, including hepatic enzymes, renal function, troponin and coagulation, were normal. A chest X-ray revealed a bilateral fluidothorax, left-sided enlargement of the heart and hyperemia of the hilum of the lungs.

The patient received an intramuscular injection of Dolsin for analgesia. After several hours there was progressive worsening of symptoms, which included dyspnea and progression of cardiac insufficiency. An ECG showed tachycardia (145 bpm), although blood pressure was little changed (115/80 mmHg).

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http://dx.doi.org/10.1016/j.crvasa.2013.06.008

Bed-side echocardiography revealed a structure of unknown origin compressing the left atrium with a residual channel of 10 mm at its maximal diameter. Left ventricular filling was depressed and there were signs of hyperkinetic circulation and low cardiac output (CO; indexed CO 1.7 L/min). There was no way to reverse the worsening status and patient died 14 h after admission to the hospital.

An autopsy discovered a perforated ulceration of the distal esophagus (Fig. 1) connected with a voluminous irregular abscess in mediastinum, filled with a green–brown mixture of chyme and inflammatory exudates. The abscess was on the posterior side of the left atrium and caused the compression observed on the echocardiogram (Fig. 2). The abscess had a diameter of 12 cm and reached the hilus of the right lung (Fig. 3). The inflamed area was bordered by adhesions that extended into both pleural spaces, but mostly on the right side. The exudate was similar to that associated with the abscess. This caused a secondary collapse of lower lobes of the lungs. A microscopic examination confirmed a benign perforating ulceration of the distal esophagus secondary to Barrett's disease, with a subsequent, large, nonspecific chronic abscess of the mediastinum.

Fig. 1 – Extensively perforated ulcer found on the distal esophagus with an adjacent open and evacuated mediastinal abscess. The brown area represents the inner part of a voluminous abscess cavity of irregular shape and a diameter of 12 cm. (For interpretation of the references to color in this figure legend, the reader is referred to the web version of this article.)

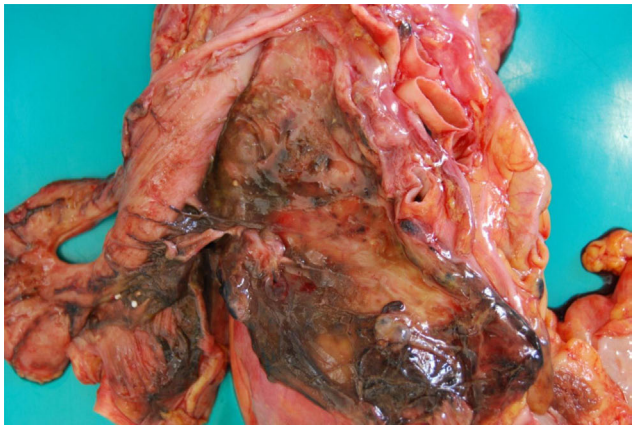

Fig. 2 – Detail view of the inner surface of the abscess cavity after removal of the esophagus (left). The abscess lies on the posterior wall of left atrium. In the upper right corner are the pulmonary veins (cut) entering the left atrium.

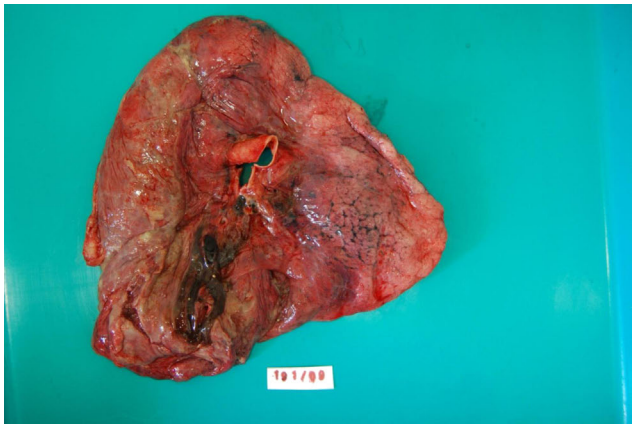

Fig. 3 – The abscess reaching the hilum of the right lung (brown dyed surface in distal part of the hilum). (For interpretation of the references to color in this figure legend, the reader is referred to the web version of this article.)

Discussion

Of the four heart chambers, the left atrium has the most intimate contact with the posterior mediastinum. The left atrium is relatively thin-walled and has a low intraluminal pressure. These features make it vulnerable to pathological compression by extracardiac structures. Clinical presentations can range from asymptomatic to cardiac insufficiency and even death. Left atrial compression leads to reduced left ventricle filling and reduced CO, as well as increased pressures in the pulmonary veins. The main diagnostic method is transthoracic echocardiography (TTE), assuming a good sonographic window is present. In other cases it may be better to use transesophageal echocardiography (TEE), although, e.g. hiatal hernias are typically difficult to examine using TEE. Use of an oral contrast, sparkling drink, may be useful, for rapid verification of a pathologic connection with the gastrointestinal tract.

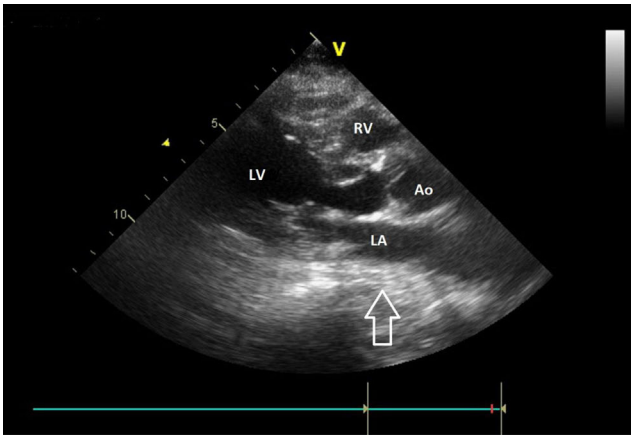

Fig. 4 – Echocardiographic picture of left atrial compression caused by a hiatal hernia (arrow). LV—left ventricle, LA—left atrium, RV—right ventricle, Ao—aorta.

Similarly intravenous contrast is useful for confirming a vascular origin of the compressing pathology [1]. Other imaging methods, such as computer tomography and magnetic resonance imaging are also frequently used.

The differential diagnosis of the left atrial compression is very broad. The most common involve diseases of the gastrointestinal tract, especially hiatal hernias (Fig. 4). Symptoms are pyrosis, dyspnea, chest pain, dysphagia, reflux and anemia [2]. More uncommon symptoms include postprandial syncope caused by compression of the left atrium and reduced CO due to an extended stomach [3,4]. One of the most common symptoms is exercise dyspnea, which is present in more than 80% of patients undergoing surgical treatment of hiatal hernias [5]. In addition to compression of the left atrium, compression of the pulmonary veins and even the coronary sinus (up to 87% patients) is often observed [5]. Surgical treatment of hiatal hernias is followed by improvement in symptoms, although, its pathophysiology is not clearly understood. Some studies have described improved ventilation parameters after surgery [2], while other studies failed to report any such improvement [6]. Extreme forms of hiatal hernias involving possible compression of the left atrium are associated with a very rare condition called an 'upside-down stomach' [7].

Diseases of the esophagus that can compress the left atrium included achalasia [8], esophageal hematoma [9], or tumors such as leiomyoma [10] and leiomyosarcoma [11].

The second group of pathologies that can lead to left atrial compression include mediastinal pathologies, especially tumors: lymphoma [12], schwannoma [13] or metastasis (i.e. of testicular cancer) [14]. Additionally, large lymphadenopathies secondary to sarcoidosis or tuberculosis in immunocompromised patients has been described [15]. Rare complications after an accidental puncture of the carotid artery, during insertion of a central venous catheter, involves a mediastinal hematoma with left atrial compression [16]. Another candidate is a mediastinal pancreatic pseudocyst [17].

The third group of pathologies include diseases of the cardiovascular system, mainly aortic dissection [18], aneurysm [19] or periaortic hematoma after cardiac surgery or aortic dissection [20]. An extremely rare complication following venous coronary artery bypass grafting is the development of a graft aneurysm, which can result in left atrial compression and cardiogenic shock [21]. Left ventricle pseudoaneurysms have also been described [22]. Typical complications following percutaneous coronary interventions include pericardial tamponade. A consequence of pericardial adhesions (i.e. after cardiac surgery) in this situation can lead to a localized hematoma compressing left atrium [23].

The fourth and final group of left atrial compression pathologies are lung carcinoma and bronchogenic cysts [24] and lung disorders in which left atrial compression causes an enlarged right lower lobe [25].

Our finding of a mediastinal abscess, in this case, can be classified somewhere between diseases of the gastrointestinal tract and the mediastinum. The rapid worsening seen in this previously chronic condition may not be a characteristic feature. It was probably caused by the sudden expansion of the abscess due to a persistent connection with the esophagus, which is consistent with the discovery of pills and food in the cavity.

Conclusion

Left atrium compression is a relatively rare condition that can have a potentially fatal course. This is something that needs to be kept in mind during routine echocardiographic examinations. Early diagnosis is very important and can be life-saving.

Conflict of interest

I can exclude any potenctial or actual conflict of interest on my case report.

Funding body

Nobody provided any financial support for the preparation of the article.

Ethical statement

The patient was treated according to ethical standards, lege artis.

Informed consent

Informed consent for treatment was not necessary in this case.

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